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# PHILOSOPHICAL TRANSACTIONS.

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April 27. 1674.

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*Considerations of Mr. Leewenhoeck, touching the Compression of the Air; sent to the Publisher in his Letter of August 15. 1673.*

I Cannot forbear to give you my thoughts concerning the Compression of the Air. I take a narrow glass-pipe, as here (in Fig. 1.) A B, hermetically sealed above in A; which pipe I fill about half full of water, as E B: Into it I insert the forcer D C, which is a wire, wound about at D with a piece of leather fitted into the glass-pipe, but first thrust into hot Candle-grease, that so neither Water nor gross Air

D

may

may pass through it. The water which is in E B, is by the Forcer D C forced up, whereby the Air, that is between A and E, is compressed into an hundred times less room than it hath before this pressure. And forasmuch as 'tis certain to me, that no Body can be brought into lesser Dimensions, than it is, except some other body be at the same time dislodged out of it, nor any Body made bigger, but some other bodies must come into it; the Air therefore cannot be compress'd together, and be made an hundred times less, but the Air must permeate the Glass; as 'tis also the common opinion, that the first and subtilest stuff of the Air passes through all close Bodies. I conceive then, that the first and finest matter of Air consists of something like grains of Sand, taking it from the finest sort to the grossest; its second matter, of something like Bodies between the grossest Sand-corns and Strawberries; its third matter, of something like bodies between Strawberries and Cherries; and that all these parts are soft and fluid. I say then, that if the particles of the first stuff always pass through the closest bodies (which I here suppose to be Sand-grains) it must follow, that by my pressure in the Glass-pipe I force through the Glass divers particles of the second stuff (they being all fluid) and compress close together the moer distant second and third stuff, and make them change their figure, and even in case there be any of the first stuff latent in the second and third stuff I cause it by the forcible pressure to be dislodged together, and to pass through the Glass. This pressure is greater than many imagine. The diameter of my Glass being of about one tenth of an Inch; if by my pressing at C I used the force but of 25 lb. weight, it follows, if I had a Glass-pipe of a whole Inch diameter, it would, to keep proportion with a Glass-pipe of one tenth of an Inch, require a force of 2500 Pounds.

These things thus supposed, being desirous to try, whether any particles of the second stuff, or other parts somewhat bigger than the smallest stuff, could be pressed or forced through the Glass; I prepared for that purpose another Glass-pipe (as *Fig. 2.*) and took a third one of half its length, and so much wider, as to shoot over the second, as here G M: Which wider pipe I closed to G by means of the fire, leaving it open  
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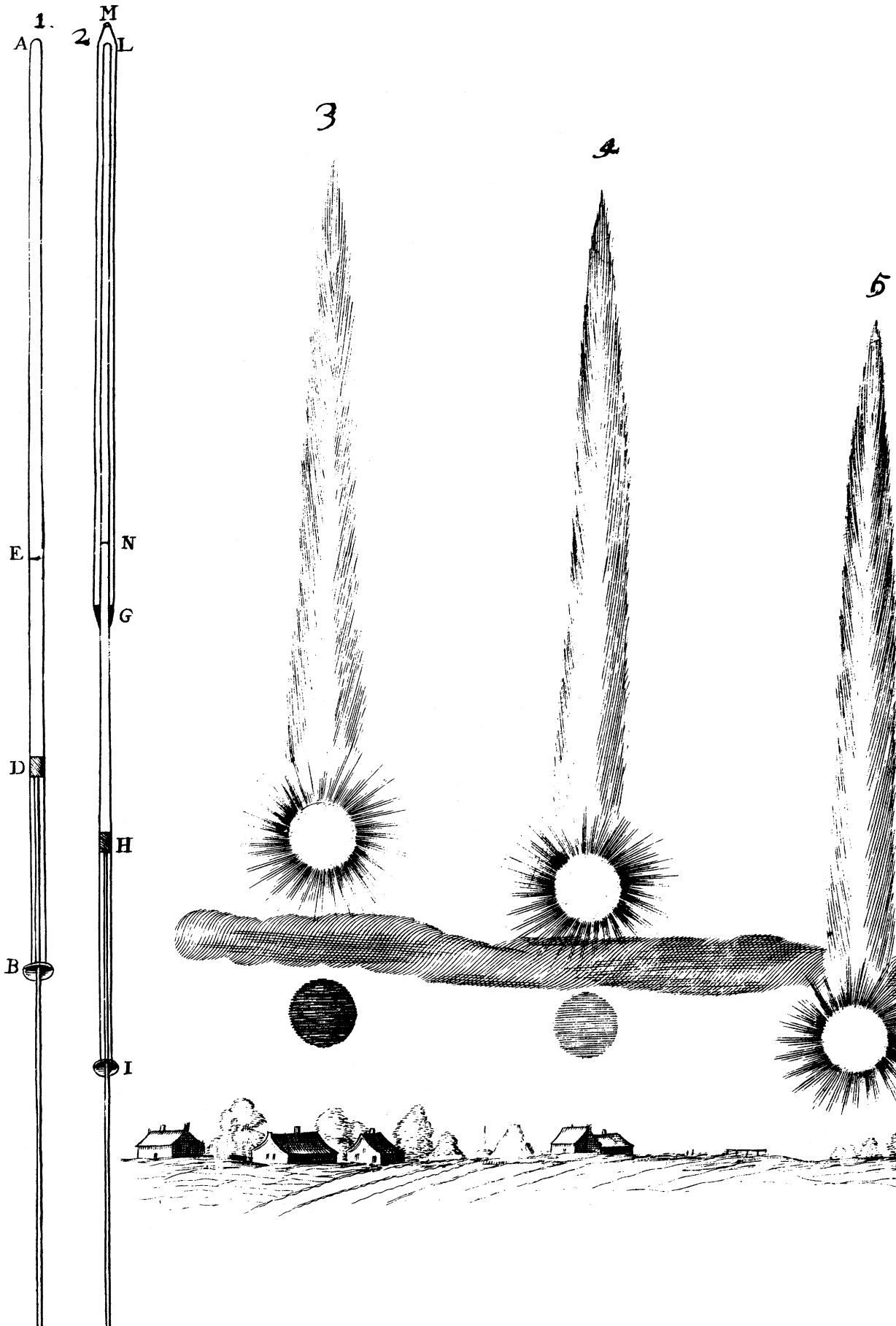
at the end M with a hole as small as a hair, imagining, that if by the Forcer K H, I should force up towards L the water that is between I N, that then the particles driven out of the inner Glafs, and being bigger than those which by the continual Ethereal motion pass through it, and passing into the exterior Glafs, would there require more space, and consequently drive out some Air at the little hole in the exterior pipe at M: And to see the event hereof, I did put in the outermost part of the small hole M a little water, which filled the hole only on the foremost part of it, thinking, that as I should drive the Air out of the innermost Glafs, the same passing into the exterior Glafs, would thrust the water out of the little hole. But what motion soever I make with the Forcer K H, and press out the Air N L, the water at the small hole M keeps its station: and yet, if I do but apply my warm hand to the exterior pipe M G, the water at M presently flies out. This puzzles me; nor can I find a satisfactory reason for this *Phænomenon*.

*More Microscopical Observations made by the same M. Leewenhoeck, and promised in Numb. 97. of these Tracts; Communicated in his Letters of August 15. 1673 and of April 7. 1674.*

1. I Have divers times endeavoured to see and to know, what parts the *Blood* consists of; and at length I have observ'd taking some Blood out of my own hand, that it consists of small round globuls driven through a Crystalline humidity or water: Yet, whether all Blood be such, I doubt. And exhibiting my Blood to my self in very small parcels, the globuls, yielded very little colour.

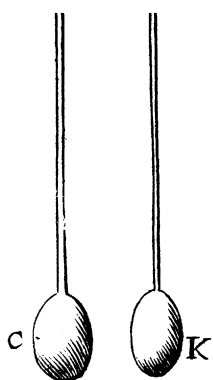
2. I have likewise observ'd some of the sweet *Milk* of Cows, and find that also to be made up of small transparent globuls, carried in the same manner as in the Blood through a clear liquor.

3. I have also viewed in my Microscope some of the *Hair* of my own Head, which heretofore I imagined to have seen to grow out of globuls, that are not driven out to the end, as I observed it was done in Trees and Plants, but that they united in the skin, and in the root of the hair; so that *Hair* grows



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